EFFECT OF LEACH LIQUORS AND COMMERCIAL EXTRACTS ON THE PROPERTIES OF THE LEATHERS*

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Abstract

To make powder extract, the leach liquors of the tan material are subjected to a very high temperature (60—200°C), at times under vacuum and sometimes without vacuum. Under such conditions of high temperature some of the tannins are likely to get denatured.

A tanning experiment was conducted using both fresh leach liquors and commercial extracts of different tanning materials under identical conditions in order to assess the final properties of the leathers obtained there from. The results showed that the penetration of the myrab extract through the pelt was extremely slow as compared to that of the fresh beach liquors.

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In leather industry, tanners use both leach liquors and solid extracts of vegetable tan materials for the manufacture of leathers. In the case of liquors the blended barks and nuts are extracted with water in countercurrent principle with or without steam. The commercial solid or spray dried extracts on the other hand are prepared by leaching the vagetable tanning materials with water at different tempereratures, concentrating them by vacuum evaporators and finally with another evaporation until the extract comes out as a semi solid mass. In some cases, the concentrated liquors are passed through an atomizer running at about 10,000 revolutions per minutes, as a fine spray while hot air (inlet and outlet temperatures—210°C and 110°C respectively) is blown against the flow of the liquor. At such a high temperature some of the tannins particularly-hydrolysable type, are likely to get oxidised or denatured thereby imparting undesirable properties to the leather.

The following investigation was undertaken to show the difference in the properties of the leathers tanned with leach liquors and commercial spray dried extarcts.

Experimental

A. Preparation of the tan liquors

(1) Wattle liquor—using commercial mimosa extract of know tannin content a solution of 25° BK was prepared.

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(2) Myrab liquor—using commercial myrab extract of known strength a solution of 25° BK was prepared.

(3) Mangrove liquor—A liquor of 25° BK was prepared from spray dried mangrove extract from Andaman mangrove bark (Rhizophora mucronata)

(4) Babul extract—Liquor of 25° BK was prepared from spray dried babul extract prepared at CLRI.

(5) Leach liquor of myrab nuts : Myrab liquor was prepared by two consecutive extractions of crushed myrab nuts (Terminatra Chebula with water in the ratio 1 : 4. The mixed liquor was finally adjusted to 25° BK.

(6) Leach liquors from wattle, babul and mangrove barks.

These liquors were prepared in the usual way by extracting the crushed babul bark (Acacia Arabica). Wattle bark (Acacia Mollisima) and mangrove bark (Rhizophora Mucronata) by the counter current principle. The liquors were then made upto 25° BK

Tanning Procedure

One wet salted buffalo hide was soaked, limed and delimed in the usual way. The butt portion (5 mm thick) was then taken and made into 8 pieces each measuring 15 cm + 10 cm. The pieces were then tanned separately in the above 8 liqours, after making pelt/liquor ratio at 1 : 15. They were handled twice a day and examined each day to note the extent of penetration.

All the pieces were kept in the liquor for 30 days. The pieces were then taken out and adhering liquor was wiped off with moisetered cotton wool. The pieces were kept in the dark for drying and then analysed for their physical and chemical properties. The results are given in the Table.

Discussion of Results

From the result it was observed that the penetration of the myrab leach liquor through the pelt was very quick (6 days) as compared to myrab extract (16 days). The penetration of the myrab leach liquor was taken as complete, when the entire out section showed yellow colour. The diffusion time of the leach liquors and extract of condensed tan materials like wattle and babul was found to be almost the same. The penetration of the mangrove extract was incomplete even after 30 days, whereas mangrove leach liquor took only 16 days to penetrate.

Myrab tannins are made up of a number of constituents differing only in particle size. They are hydrolysable in nature and are likely to be broken down

mainly into two components namely sugar and gallic acid. When these tan molecules are subjected to a very high temperature it is quite probable that they became denatured due to oxidation thereby imparting darker colour to the extract. The slow penetration of the myrab extract through the pelt might be due to these oxidised and dark coloured tan molecules. The same trend was found in the case of spray dried mangrove powder. But this might be due to entirely different reasons, Mangrove tan molecules are presumably polymers of lucocyanidin and when these polymers are subjected to a very high temperature, thay are likely to be further polymerised due to oxidation, Probably these oxidises polymers penetrate through the pelt very slowly.

The penetration of other condensed tan liquors like wattle and babul were not affected when they were prepared from their commercial powder extract thus indicating that these tan molecules could stand the strain of high temperature without adversely affecting the inital properties.

The final weight yield of all the leathers tanned with the extracts showed slightly more then those tanned with the leach liquors. This was of course due to more agglomerated tan molecules of the extracts, which are likely to be deposited on the surface of the leather thereby giving rise to more yield.

The degree of tannage and shrinkage temperature of the leathers tanned with commercial extracts including myrab were found to be better than those tanned with leach liquors. In the case of spray dried mangrove extract the penetration was not complete even after 30 days and hence all the difference in these properties. The colour of the leathers tanned with the leach liquors was found to be better than these derived from extracts. Myrab extract yielded leather having very dark colour.

It could therefore be concluded that as far as possible myrab be used in the form of fresh leach liquor instead of extract, in the leather industry. In the case of mangrove, except for retardation in penetration, other properties of the leather tanned with the extract would be better. But this inferior property of the extract could be overcome if it is suitably modified. Babul, in the from of solid extract, can conveniently be utilised.

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CHEMICAL AND PHYSICAL PROPERTIES OF THE LEATHERS

(Chemical analysis on 14% moisture basis)

I—Leach liquors II—Extracts

Sl. No.	*Leather tanned with*	*Insoluble ash (%)*	*Water solubles (%)*	*Hide Substance (%)*	*Fixed tan (%)*	*Degree of tannage*	*Ts (°C)*	*Yield (% on delimed pelts)*	*Penetration (days)*	*Colour*
1.	Wattle—I	Negligible	11.4	51.02	23.58	46.20	84	61	8	Light pinkish Brown
	II	,,	15.0	46.73	24.27	51.80	85	63	$8\frac{1}{2}$	Light Brown Darker than I
2.	Babul—I	,,	6.3	54.08	24.90	45.40	83	54	12	Light greyish Brown
	II	,,	14.5	47.2	24.30	51.50	86	59	13	Medium Brown
3.	Mangrove—I	,,	11.6	48.8	25.60	52.50	82	65	16	Dark Brown
	II	,,	12.9	45.8	27.30	59.60	85	68	Penetration incomplete even in 30 days.	Dark Brown (Darker than Brown)
4.	Myrab—I	,,	11.3	54.2	20.50	37.8	66	55	6	Light yellowish Brown
	II	,,	11.4	49.2	25.40	51.6	70	58	16	Dark yellowish Grey.